

ON THE PERIANTH AND SEED CHARACTERS OF
CHENOPODIUM HYBRIDUM AND
C. GIGANTOSPERMUM

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In the course of identifying a collection of Chinese plants, the writer noticed that the Chinese specimens of *Chenopodium hybridum* L. have fruit with the surface structure different from that of European plants. To investigate this difference the writer has made critical comparisons of Asiatic, European, and American specimens of this species in the broad sense, as it is represented in the collections of the Arnold Arboretum and Gray Herbarium. The comparisons were made with special regard to three characters: 1) form of the leaf, especially of the base, 2) structure of perianth, 3) structure of the seed surface. This last character was studied most carefully as it is a very important one in the taxonomy of Chenopodia. Together with the examination of herbarium material the appropriate literature also was consulted.

With regard to the form of the leaf, this study showed that there are no significant differences among the plants of the three geographic areas (cf. Figs. 1 a,b, 2 a,b, 3 a, and 4 a). Wahl (p. 16, 1954), however, says that the American plants have "leaves rounded, truncate or slightly cordate at base . . ." and the European "leaves truncate-cordate at base . . ." The writer could not perceive this fine difference. It may be noted that the European specimens sometimes have leaves with somewhat rounded lobes, while the Asiatic ones always have their lobes strongly and acutely pointed.

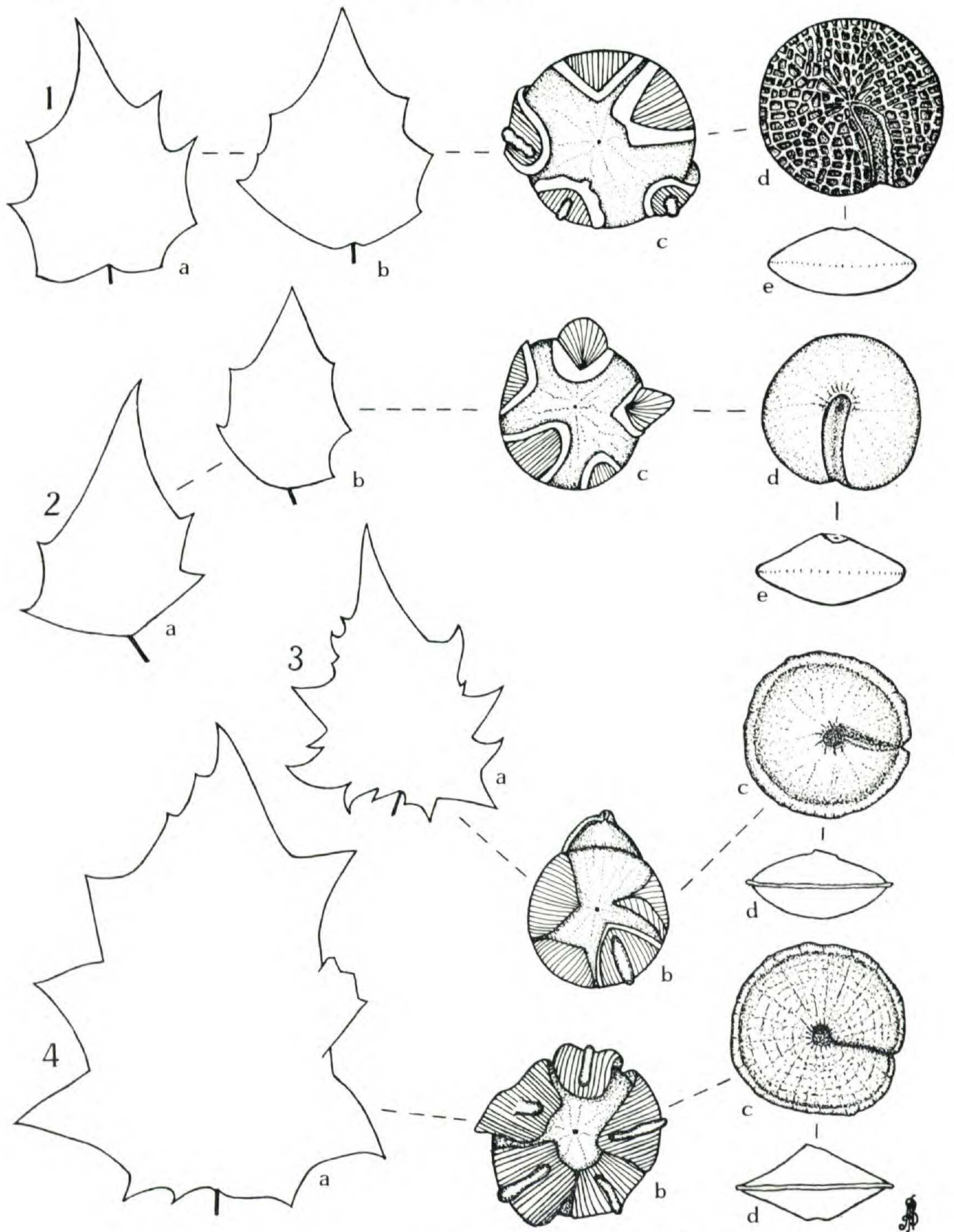
A review of the structure of the perianth gave more interesting results. Both American and European plants have sepals with a definite white margin and green center. The sepals are a little narrower and more distant from each other in American specimens than in European ones (cf. Figs. 1 c, 2 c). However, the writer has not observed the

sharp difference between these groups of plants as described by Wahl (p. 16, 1954). He says, of European plants, "Sepals ovate, their edges meeting to overlapping, covering at least more than half of the mature fruit . . ." and of American plants "Sepals ovate to broadly linear their margins meeting or separated by as much as their width and exposing more than half of the mature fruit . . ." An unexpected, striking difference in this character was found in Asiatic plants. The specimens from China and Mongolia have very broad sepals with meeting and overlapping margins, nearly covering the entire fruit. In addition, the sepals are without white margins or rarely have them weakly developed.

The seeds of each of the three groups of plants are very distinctive, except in size which ranges from 1.5 to 2.5 mm. in diameter. The European material, from which the species was described, has the seeds (Fig. 1 d,e) more or less convex-lenticular, sometimes obliquely lenticular, with rounded margins, black, glossy or dull, more or less definitely foveolate-reticulate, often with the remnants of pericarp in the pits. This description corresponds to that of Hegi (1909-12) and Iljin (1936), although the former says that the seeds are glossy and the latter that they are dull. In fact, both glossy and dull seeds occur among the European plants.

The American material has seeds of a different kind (Figs. 2 d,e). These are sometimes strongly convex-lenticular, always bluntly keeled at the margin, black, glossy, smooth, except for minute radial wrinkles, with readily separable pericarp. The writer has not seen any umbonate-lenticular seeds with sharply defined margin as described by Wahl (1954).

The Asiatic plants have seeds of two kinds. Seeds of plants from the Amur River and Mongolia are close to the European type (Figs. 4 c,d). They are indistinctly foveolate-reticulate and sometimes have a sort of rim along the margin. The plants from northern China probably also belong to this group. The seeds of the plants from southern China (Figs. 3 c,d) are very convex-lenticular with the umbo in the center and a rim at the margin. They are black,



Figs. 1-4. Semidiagrammatic figures of leaves, fruits and seeds of *Chenopodium* species. (Leaves, \times ca. $\frac{1}{2}$; fruits and seeds \times ca. 10). 1, *Chenopodium hybridum* from Europe: a, b, leaf outlines (a, Flora Carpatica, *C. Branesik* [GH]; b, France, *F. Roux 120* [GH]; c, top view of fruit with perianth; d, top view of seed; e, side view of seed (c-e, Flora exicc. Reipubl. Chechoslov. No. 1323, *F. Svestka* [A]). 2, *Chenopodium gigantospermum* from North America: a, b, leaf outlines (a, Canada, *Edith Scamman 3368* [GH]; b, USA, *F. Lindheimer*

glossy, smooth, except for minute radial wrinkles and grooves. Consequently, they are nearest to the American type.

This study of *Chenopodium hybridum* L. *sensu lato* from Europe, Asia, and America demonstrates that this species may be divided into three taxa. The American plants have been separated from the European ones as *C. gigantospermum* Aellen (*C. hybridum* L. var. *gigantospermum* (Aellen) Rouleau); they might be better treated as a subspecies. The Asiatic plants, however, have not been distinguished from the European ones. This perhaps is due to insufficient study of the Asiatic material and inadequate comparison of it with the European, for example, as in the *Flore illustrée du Nord de la Chine* (Kung, 1935).

Although the writer has noted the perianth and seed characteristics that distinguish the Asiatic plants of *Chenopodium hybridum* L. from those of Europe he has not proposed new taxa because of the limited material available for this study.

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515 [GH]); c, top view of fruit with perianth; d, top view of seed; e, side view of seed (c-e USA, *Wahl & Niering* 8288 [GH]). 3, *Chenopodium hybridum* from South and Western China: a, leaf outline (Western China, Kansu, *R. C. Ching* 274 [GH]); b, top view of fruit with perianth; c, top view of seed; d, side view of seed (b, South China, Yunnan, *C. W. Wang* 70223 [A]; c-d, *idem*, *C. W. Wang* 70320 [A]). 4, *Chenopodium hybridum* from Mongolia: a, leaf outline (Kalgan, *C. W. Wang* 62147 [A]); b, top view of fruit with perianth; c, top view of seed, d, side view of seed (b, Central Mongolia, *N. & V. Ikonnikov-Galitzky* 4061 [GH]; c-d, Kalgan, *C. W. Wang* 62147 [A]).